Application Number: T3-00006 **Scientific Score**: 75

Title: Training Program in Systems Biology of Stem Cells

Specific names of individuals and institutions are blacked out to preserve applicant confidentiality where possible.

Proposal Abstract as Submitted by Applicant

We propose to develop a Type III Specialized Training Program, to include 6 trainees – 3 at the pre-doctoral level and 3 at the postdoctoral level. Drawing from [redacted] strengths in computational genomics and basic biological research, our "Training Program in Systems Biology of Stem Cells" will provide students with a solid understanding of the biology of stem cells, the skills to utilize stem cells in their own research, and the ability to devise computational approaches and to integrate results from computational analyses into their own work. The program will underscore the value of stem cell research in developing therapies and cures for human disease. [redacted] faculty have exceptional expertise in areas of research that are critical for advancing stem cell research, including genome sequence analysis, RNA biology, cell cycle regulation, early development, neuroscience, and epigenetic mechanisms of gene regulation such as chromatin remodeling. We are particularly well-suited to apply engineering approaches to challenges in stem cell research - many of our faculty regularly work across the divisional boundaries between science and engineering – and to train CIRM Scholars from broad backgrounds at this interface. Furthermore, as one of the premier public institutions for humanities and social science research, we are proposing a stem cell ethics course that will be exceptional in the range and depth of issues covered. We are developing this program in parallel to programs being developed at [redacted], [redacted], [redacted]. We intend to share certain courses and other activities such as joint seminars and symposia. We advocate the formation of a [redacted] Stem Cell Alliance and have been in early discussions about such an organization with some of our neighboring institutions. We will also provide a number of on campus opportunities for enriching the training experiences of CIRM Scholars, including a seminar series, a journal club, an annual retreat, and a web page devoted to news, events and opportunities related to stem cell research.

Benefit of this Program to California

This program will benefit the people and the state of California by providing high-quality training in the scientific, clinical, social, and ethical aspects of stem cell research to the scientists and clinicians who will develop and apply future therapies in this rapidly emerging field.

Summary of Review

This type III application proposes to develop a training program for pre-doctoral and post-doctoral fellows that will focus on systems biology in stem cells. The program forms at the interface of two existing graduate programs: one in molecular, cell, and developmental biology and the other in bioinformatics. The proposal provides a well-balanced training program integrated with functional genomics and computational

biology. The program director is a Howard Hughes investigator with a strong background in genomics and an outstanding leader in computational biology. The director has trained a large number of pre-doctoral and post-doctoral trainees, but has no previous experience as a program director for training. An executive committee consisting of one faculty mentor from each participating department will select trainees and mentors and oversee the administration of all components. Members of this committee are not identified. There are 12 mentors listed, most of which are well funded by NIH and have strong records of research with publication in excellent journals. The quality of training should be excellent, but one deficiency could be the lack of clinical expertise. The faculty has extensive experience in areas related to genomics and only a few have specific interests in stem cells currently. The applicant pool draws from the existing graduate programs, both having NIH support and a record of success. The institution's administration has committed lab space and funds although it is unclear just what the facilities include for this new program. Because of the excellent caliber of the research faculty and the uniqueness of the interface of biology and engineering, this program should provide excellent and unique training.

Overall Strengths and Weaknesses

Overall, this program has a good scientific rational for training of CIRM scholars in genomics as it relates to stem cells. It provides a unique educational opportunity at the intersection of stem cell biology and computational biology. The faculty has a strong research record with evidence of success in training, but few are specifically involved in embryonic stem cell research. The new courses are likely to be cohesive and broad-reaching, if only deficient of clinical input.

Recommendations

Highly meritorious and recommended for funding.

	Pre	Post	Clinical	Total
Fellows Requested:	3	3	0	6
Fellows Recommended:	3	3	0	6

	Year 1	Total
Budget Requested:	$ 400,349	$ 1,217,132
Budget Recommended:	$ 400,349	$ 1,217,132